

COLLOQUIUM INVITATION

by

GDCh-Ortsverband and Institute for Chemistry together with the Institute of Physics

Thursday, 09.06.2022, 5.00 p.m., large lecture hall (W03 1-161)

speaks

**Prof. Dr. Hans-Joachim Freund,
Fritz Haber Institut der Max Planck Gesellschaft, Berlin, Germany**

about

"Model Systems for Heterogeneous Catalysts at the Atomic Scale"

We have created model systems for heterogeneous catalysts on the basis of thin oxide films. This permits us to apply the toolbox of surface science for characterization and reaction studies. In the presentation I will discuss two case studies to demonstrate how those systems may be studied at the atomic scale. The first one discusses a novel characterization technique, namely surface action spectroscopy, using concepts developed in gas phase studies to record vibrational spectra of extremely dilute specimen based on messenger desorption. We demonstrate the extreme surface sensitivity of this technique by applying it to surface states of oxide surfaces, i.e. vanadia as well as iron oxides. The second case study deals with a reaction in confined space using a model system based on a thin silica film, which is only bound to a metal substrate by dispersive forces, leaving a space between the oxide film and the metal substrate. Here we study water formation from intercalated oxygen, adsorbed on the metal surface and hydrogen provided from the gas phase in operando, and deduce the details of the kinetics of the reaction in confined space in direct comparison to the equivalent open space reaction. To this end we use a spectro-microscope, operated at BESSYII and developed in the group, which allows to observe tempo-spatial distribution of reactants and deduce apparent activation energies. Those experimental observations are interpreted on the basis of DFT calculations and kinetic models.

All interested persons are cordially invited.

Prof. Dr. Katharina Al-Shamery (IfC)

Prof. Dr. Thomas Müller (GDCh-Ortsverband Oldenburg)

Prof. Dr. Niklas Nilius (IfP)